REMARKS

This paper is responsive to the Office Action mailed September 27, 2004. In the Office Action, Claims 1, 5, 8, 11 and 13 were rejected as being anticipated by Koslar et al. (US 6,614,853). Claims 1-3 were rejected as being unpatentable over Brydon et al. (Radio Receivers article) in view of Koslar (US 6,404,338). Claim 6 was rejected as being unpatentable over Brydon and Koslar '338 and further in view of Matsui (US 6,049,563). Claim 9 was rejected as being unpatentable over Koslar '338 in view of Brydon. Claim 7 was indicated as including allowable subject matter. Claim 8 has been amended as indicated above. Claims 1-3, 5-9, 11 and 13 are pending in the application.

Applicants thank Examiner Liu for the time and consideration he has extended to the present application, and for indicating the allowability of Claim 7. Applicants have carefully considered the prior art and arguments presented by the Examiner in the September 27 Office Action. As explained below, applicants believe that the claims presented in the present application are patentable over the prior art.

Claims 1, 5, 8, 11 and 13 (Rejection Based on Koslar et al. '853)

Figure 1a in the Koslar et al. patent (hereinafter "Koslar '853") discloses a transmitter comprised of a pulse generator (**1**) followed by a pulse former (**2**), a low pass filter (**3**), an oscillator (**5**) and AM modulator (**4**). In contrast, Figures 1 and 3 of the present application show a differential phase modulator (**12**) followed by an RF switch controlled by a pulse generator (**14**). Unlike Koslar '853 in which data modulation is performed after the dispersive filter by the switch and bit discriminator (Figure 1a - **10** and **11**), the data modulation claimed in the present application is performed *before* the dispersive filter.

Moreover, Koslar '853 uses two dispersive filters (Figure 1a - **6** and **7**) to generate chirp signals with "temporarily opposite angle modulation", and these signals are used to indicate

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which symbol is transmitted. The signal appearing at point **2e** in Figure 1a does not have any information modulated on it, phase or otherwise. This form of chirp spread spectrum modulation is completely different from the present invention as claimed. The present invention as claimed generates a pulsed signal containing phase information which carries the data (Figure 1 - **12** and **14**), and spreads the modulated signal with a dispersive filter (**16**). The resulting signal is transmitted over the channel. The method of transmission in the present application in clearly different than that which is presented in Koslar '853.

Claim 1, in particular, recites: "generating a pulsed signal in which information is carried in the phase of the pulsed signal" and "spreading the pulsed signal using a dispersive filter to form a chirp spread spectrum signal". This aspect of the claimed invention is not taught or suggested in Koslar '853, and thus the rejection of Claim 1 based on Koslar '853 should be withdrawn. Claim 5 should also be allowed, both for the subject matter recited therein and for its dependence on allowable Claim 1.

Claim 8 has been amended as indicated above to make explicit that which was already implicit in the claim. In particular, Claim 8 recites: "a pulsed signal generator incorporating a modulator" and "a dispersive filter bank comprising plural filters, the dispersive filter bank being connected to receive a pulsed modulated signal from the pulsed signal generator, where the excitation of each of the plural filters corresponds to a different transmitted symbol value, the output of the dispersive filter bank being a chirp spread spectrum signal". The resulting output is upconverted for transmission. This aspect of the claimed invention is not taught or suggested in Koslar '853, and thus the rejection of Claim 8 based on Koslar '853 should be withdrawn. Claim 13 should also be allowed, both for the subject matter recited therein and for its dependence on allowable Claim 8.

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Claim 11 is directed to a receiver for communicating over a wireless indoor communications channel with a transmitter defined by Claim 8. Claim 11 includes an RF receiving section that is configured to produce a received chirp spread spectrum signal as output. Claim 11, in part, further recites: "an inverse dispersive filter matched to the dispersive filter in the transmitter and connected to receive the chirp spread spectrum signal from the RF receiving section and generate a received pulsed signal" and "a phase demodulator connected to the inverse dispersive filter, the phase demodulator generating cophased channel impulse responses from the received pulsed signal." For these claimed elements and for the reasons discussed above with respect to Claim 8, Claim 11 is allowable over Koslar '853.

Claims 1, 8 and 11 are also allowable for their recitation of passing cophased channel impulse responses through a low-pass filter to generate data symbols. The information imparted on the signal **2o** of Figure 3a of the Koslar '853 patent is not phase information, but amplitude information produced by the output of the two dispersive filters, as indicated in Figures **2m** and **2n**. The information is carried by the group delay characteristics of the dispersive filters, as outlined in the abstract of Koslar '853. This group delay characteristic is fundamentally distinct from phase information which is imparted upon the pulsed signal before application to the dispersive filter, as discussed and claimed in the present application.

Claim 1, in particular, recites: "removing the phase of the received signal, using a phase demodulator, thereby generating cophased channel impulse responses" and "passing the cophased channel impulse responses through a low-pass filter to generate data symbols". Claim 11, for its part, recites: "a phase demodulator connected to the inverse dispersive filter, the phase demodulator generating cophased channel impulse responses from the received pulsed signal" and "a low-pass filter on the output of the phase demodulator for generating data symbols from the cophased channel impulse responses". These aspects of the claimed invention are not taught

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or suggested in Koslar '853, and for these additional reasons, the rejection of Claims 1 and 11 based on Koslar '853 should be withdrawn.

Claims 1-3 (Rejection Based on Brydon et al. Article and Koslar '338)

Applicants have carefully considered the Brydon et al. article and respectfully point that the Brydon article does not disclose any sort of transmitter structure. Figure 4 of the Brydon article does not teach a modulator, but instead teaches a demodulator. The caption is a misprint.

Furthermore, cophased channel impulse responses are not obtained anywhere in the Koslar '338 patent or in the Brydon article. In the present application, cophased channel impulse responses are used in combination with a low-pass filter which acts as a RAKE receiver. The low-pass filter, which is used to "gather up the signal energy which has been dispersed by the channel" (as outlined in the abstract of the present application), is fundamentally distinct from an embodiment of a low-pass filter that is used to reduce high-frequency noise, as is the case in the Koslar '338 patent. In view of the fact that cophased channel impulse responses are not available anywhere in the Koslar '338 patent, using a low-pass filter as a RAKE receiver is not possible with Koslar's invention, and therefore would not have been obvious to those skilled in the art. The Brydon article provides no disclosure that cures this defect in the Koslar '338 disclosure.

Accordingly, Claim 1 and its dependent Claims 2-3 are patentable over any combination of the Brydon article and Koslar '338.

Claim 6 (Rejection Based on Brydon et al. Article and Koslar '338 in view of Matsui)

Claim 6 is dependent on Claim 1 and should thus be allowable for at least the reasons discussed above with respect to Claim 1. Claim 6 also recites, in part, recovering the information carried in the phase of the pulsed signal by "applying an equalizer to the cophased channel impulse responses to reduce intersymbol interference caused by the channel multipath". An equalizer is shown in the present application being used in conjunction with the receiver

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(*e.g.*, see Figure 9) to reduce the channel multipath. Figure 9, in particular, shows the use of a "fast phase demod" in conjunction with a "slow phase demod" to train the equalizer. Figure 10 shows non-overlapping cophased channel impulse responses during the training period, and overlapping cophased impulse responses during the data period.

Using two separate demodulators to train the equalizer, in conjunction with the dispersive filter, is not known or suggested in the prior art. This technique is not taught or suggested in either the Koslar '338 patent or the Brydon article. It is also fundamentally different from the technique used by Matsui. Accordingly, for this additional reason, the rejection of Claim 6 should be withdrawn.

Claim 9 (Rejection Based on Koslar '338 in view of Brydon et al. Article)

The Examiner correctly pointed out that the Koslar '338 patent does not disclose all of the elements claimed in Claim 9. However, the Brydon article fails to sure the deficiency of Koslar '338. The Brydon paper does not disclose any type of transmitter structure. Figure 4 is not a transmitter structure but a receiver structure. As noted above, the caption underneath is a misprint. The Examiner is requested to note the input "DPSK chirp signal" and the output "data". This is not a modulator, but rather a demodulator. Claim 9 is in allowable condition, for its dependence on allowable Claim 8, and for the additional subject matter recited therein. The Examiner is respectfully requested to withdraw the rejection of Claim 9.

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CONCLUSION

For the reasons explained above, applicants respectfully submit that Claims 1-3, 5-9, 11 and 13 are in allowable condition. Early action by the Examiner to reconsider the application and issue a notice of allowance is respectfully requested. Should the Examiner have any questions that can be resolved by telephone, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

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Date: December 27, 2004

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